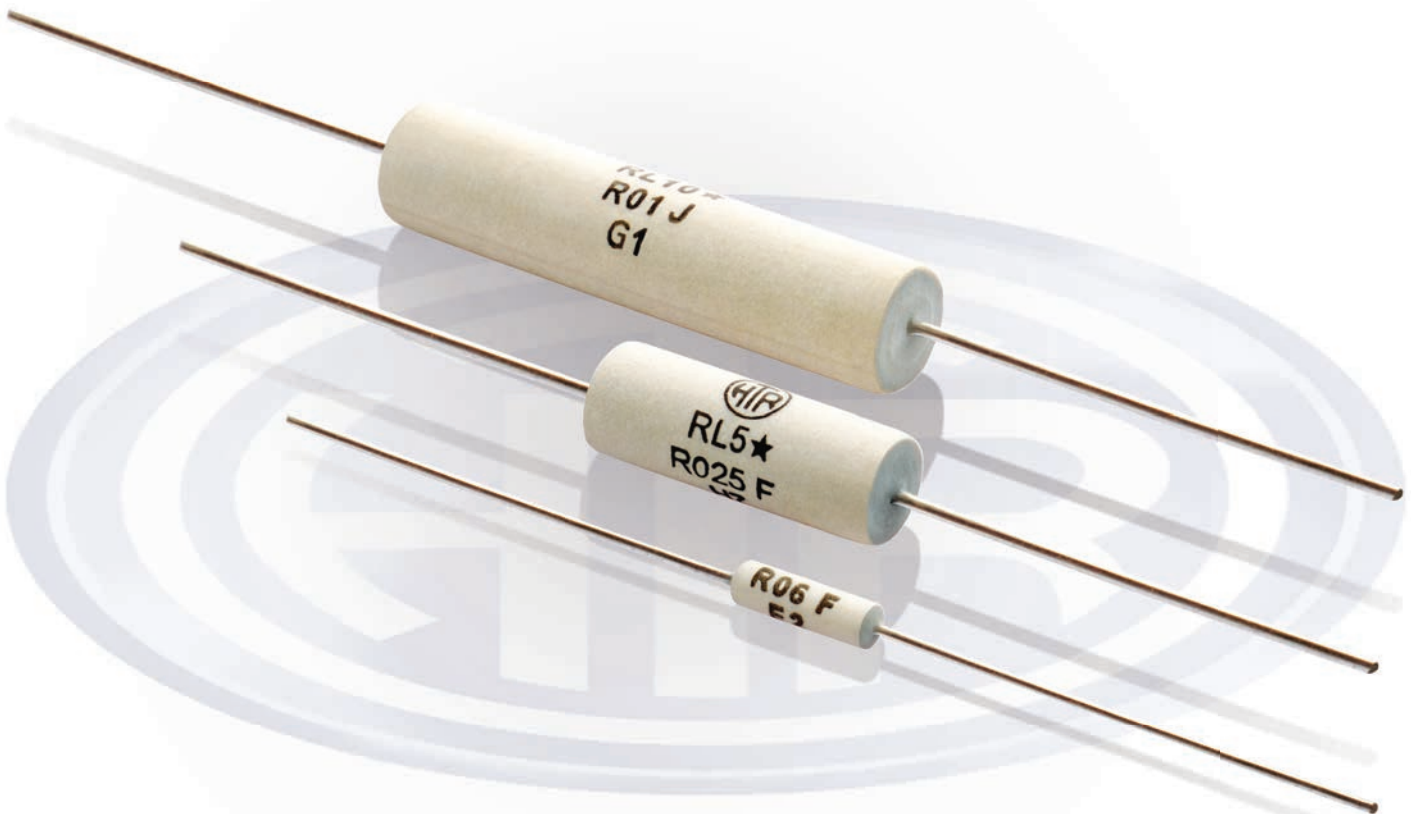


**CURRENT SENSE / LOW OHM  
CERAMIC ENCASED TYPE**

**RL  
SERIES**

**LOW OHM / LOW INDUCTANCE  
Power Ceramic Encased Resistors  
Industrial Applications**

- Superior alternative to replace moulded device of identical size
- Negligible inductance
- Highly thermal efficient power to size ratio
- Any resistance value possible within resistance range given
  - 0.5W to 10W
  - R0015 to R 80

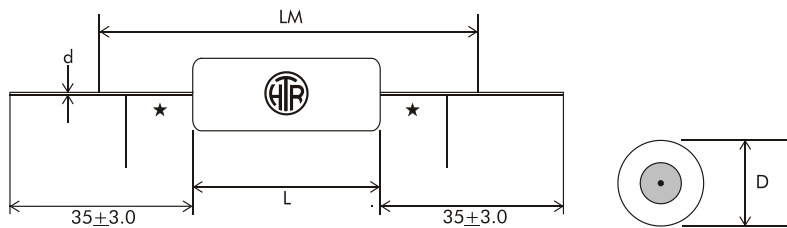




CURRENT  
SENSE / LOW  
OHM  
CERAMIC  
ENCASED TYPE

**RL**

**PHYSICAL CONFIGURATION**



★ 4mm reduced solderability in this area

HTR TYPE	POWER RATING at 40°C (Ambient)	DIMENSIONS (mm)				RESISTANCE RANGE		TYPICAL WEIGHT PER PC (gms)
		L ±1	LM ±1	D ±1.0	d ±0.05	min	max	
RL0.5	0.5W	8	30	3	0.6/0.8	R004	R055	0.5
RL1	1W	10	30	3	0.6/0.8	R004	R10	0.6
RL2	2W	10	30	4	0.8/1.0	R002	R10	0.8
RL3	3W	14	40	5	0.8/1.0	R003	R22	1.1
RL4	4W	18	40	5	0.8/1.0	R003	R30	1.4
RL5	5W	22	45	8	1	R0015	R39	3.2
RL10	10W	42	60	9	1	R003	R80	6.5

- Resistance values must be checked using 4½ digit micro-ohm meter with four wire system and insulated clips. The resistance value must be checked at dimension LM as given in the table above.

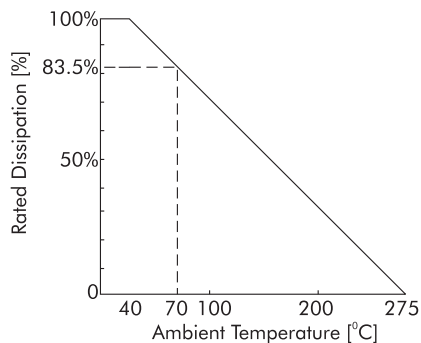
**TEMPERATURE RISE TABLE**

(Ambient Temperature 32°C)

HTR TYPE	TEMPERATURE AT FULL POWER DISSIPATION / LIMITING VOLTAGE	
	Actual Temperature on Resistor Body	Actual Temperature on Resistor Termination (10 mm from resistor body)
RL0.5	70°C	50°C
RL1	85°C	60°C
RL2	125°C	75°C
RL3	130°C	75°C
RL4	130°C	75°C
RL5	142°C	78°C
RL10	220°C	95°C

- As temperature rise varies between different resistance values, if this parameter is required in detail, please provide details to the factory whereupon a suitable graph for that particular resistance value shall be provided.

**DERATING CURVE**





CURRENT  
SENSE / LOW  
OHM  
CERAMIC  
ENCASED TYPE  
**RL**

## ELECTRICAL & ENVIRONMENTAL CHARACTERISTICS / DATA

PARAMETER/PERFORMANCE TEST & TEST METHOD	PERFORMANCE REQUIREMENTS
<b>Power Rating</b> (Rated Ambient Temperature)	Full Power dissipation at 40°C and linearly derated to zero at 275°C (Refer Derating Curve above)
<b>Resistance Tolerances Available</b>	±10% (K); ±5% (J); ±3% (H); ±2% (G); ±1% (F); ±0.5% (D)
<b>Temperature Range</b>	-55°C to +275°C with suitable derating as per derating curve
<b>Voltage Rating / Limiting Voltage / Max. Working Voltage Voltage Proof / Dielectric Withstanding Voltage</b>	$V = \sqrt{P \times R}$ $\Delta R \pm [0.2\% + R05]$ - No flashover or mechanical (based on 1000V rms for 60 secs) damage
<b>Insulation Resistance</b> (MIL STD 202F - Test Method 302)	>1000M (Min)
<b>Short Time Overload</b> (5 x Rated Power upto 3 watts and 10 x Rated Power 5 watts and above for 5 secs)	$\Delta R \pm [0.5\% + R0005]$ - Average $\Delta R \pm [1\% + R0005]$ - For resistance values near maximum range
<b>Temperature Co-efficient of Resistance</b> (Measured from -55°C to +125°C referenced to +25°C)	± 60 to 400ppm/°C (Depending on resistance value)
<b>Thermal Shock</b> (-65°C to +125°C, 5 cycles, 15 mins at each extreme temperature)	$\Delta R \pm [0.2\% + R0005]$ - Average
<b>Mechanical Shock</b> (Specified Pulse) (MIL STD 202F - Test Method 213B condition 'C')	$\Delta R \pm [0.1\% + R0005]$ - Typical
<b>Moisture Resistance</b> (MIL STD 202F - Test Method 106E with step 7b eliminated)	$\Delta R \pm [0.2\% + R0005]$
<b>Damp Heat</b> (Steady State) / Humidity (40°C at 95% R.H for 250 hours)	$\Delta R \pm [0.5\% + R0005]$
<b>Endurance - Load Life</b> (70°C with limiting voltage - 1.5 hours on / 0.5 hours off)	$\Delta R \pm [1.5\% + R0005]$ Average-2000 hours duration $\Delta R \pm [0.5\% + R0005]$ Typical-1000 hours duration
<b>Solvent Resistance</b> (IPA for 60 secs ± 10 secs)	No effect on case filling / Marking

## MECHANICAL SPECIFICATIONS

PARAMETER/PERFORMANCE TEST & TEST METHOD	PERFORMANCE REQUIREMENTS
<b>Pull Test / Robustness of Terminations</b> (Direct load 2 to 4.5 kgs depending on size for 15 secs)	No effect
<b>Resistance to Soldering Heat</b> (260°C - 270°C for 4 secs)	$\Delta R \pm [0.1\% + R0005]$ – Typical
<b>Solderability</b> (MIL STD 202F – Test Method 208F)	Must meet the requirements laid down (95% satisfactory coverage)
<b>Marking</b>	As per IEC Pub. 60062

## TYPICAL APPLICATIONS

- RL series is an innovative method of providing low inductance resistors in a cylindrical ceramic body and is increasingly replacing the moulded version due to its performance superiority and lighter weight.
- The resistive element consists of a flat metal band which is spot welded to the copper terminals before encapsulation.
- The resistors are finding increasing use in industrial applications where pulse rating and ability to absorb high inrush current is required.
- Another important application is Current Sensing in applications which include switching and linear power supplies, instruments and power amplifiers.
- For the effective utilization of these resistors, please refer to "Application/design notes for current sense resistors".

Note : Type RL 0.5 and RL - 1 can be supplied with lead diameter of 0.6mm instead of 0.8mm and RL2 / 3 & 4 can be supplied with lead  $\phi$  of 1 mm instead of 0.8 mm. Please specify at the time of placing the order.

Taping : Types RL 0.5, 1, 2, 3, 4, 5 and 10 can be supplied in taped form. Please refer to tape / ammo pack specifications.

Note : The ceramic cases used may be steatite ceramic, cordierite ceramic or high alumina ceramic. Thus, the ceramic cases may be off-white or variations of brown / grey, colours which are inherent to these ceramic material.

## ORDERING INFORMATION

Series	Type	Packing	Resistance Value	Tolerance
RL	RL5 / RL5*	Bulk RL5 / RL5* Tape Ammo RL5T/RL5*T Tape Reel RL5TR/RL5*TR	R005	J

1. For RoHS version – RL2 \*
2. For Tape / Reel packing – RL2 TR
3. For Tape / Ammo packing – RL2 T
4. If the current required during normal operation exceeds 31 amps on a continuous basis, it is advisable to opt for 2mm terminations. For this – RL4 (2), RL5 (2), RL10 (2)
5. Specify lead diameter at the time of ordering. RL1 (6) OR RL3 (1)